



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/067,905	02/08/2002	Sankar Dasgupta	T8466406US	8030

7590 08/24/2004

Gowling Lafleur Henderson LLP
Suite 4900
Commerce Court West
Toronto, ON M5L 1J3
CANADA

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
----------	--------------

1745

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/067,905

Applicant(s)

DASGUPTA ET AL.

Examiner

Raymond Alejandro

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01/15/04 & 06/28/04.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This submission is provided in response to the amendments filed 01/15/04 and 06/28/04.

The applicants have overcome the objection and the 35 USC 112 rejection. Refer to the abovementioned amendment for specific details on applicant's rebuttal arguments. However, the present claims are finally rejected over the same art as seen below and for the reasons of record:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
3. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsaki et al 5856043 in view of Nakagiri et al 6558841.

The present application is directed to an anode for a lithium battery wherein the disclosed inventive concept comprises the specific weight percent carbon fibres.

With respect to claims 1, 8 and 19:

Ohsaki et al disclose a non-aqueous electrolyte secondary battery (TITLE) wherein the battery comprises an anode comprising a graphitized vapor-grown carbon fibers (ABSTRACT) wherein the anode is a compacted body comprising pressed graphitized vapor-grown carbon fibers (COL 3, lines 40-50) wherein the anode also comprises a binder made from a polymeric resin and an electric conductor (*the substrate*) having a function of supporting the electrode material (COL 6, lines 23-40). Ohsaki et al also teach the spherical graphite which is a mesocarbon microbeads and a mesocarbon fiber (COL 3, lines 61-63).

With respect to claims 2 and 9:

It is disclosed that the vapor-grown carbon fibers has a diameter no greater than 70 nm (COL 6, lines 14-20). Ohsaki et al also teach the spherical graphite which is a mesocarbon microbeads and a mesocarbon fiber (COL 3, lines 61-63).

With respect to claims 4 and 11:

It is disclosed that the carbon fibers are vapor grown carbon fibers (ABSTRACT/COL 5, lines 38-42/COL 6, lines 14-19).

With respect to claims 5-6, 12-13 and 15-18:

As to the method limitation, *i.e. having the nano-fibres subject to the specific vacuum and heat treatment*, it is noted that a method limitation incorporated into a product claim does not patentable distinguish the product because what is given patentably consideration is the product itself and not the manner in which the product was made. Therefore, the patentability of

Art Unit: 1745

a product is independent of how it was made. Examiner's note: it is noted that the instant claims are being construed as product-by-process claims and that the product itself does not depend on the process of making it. Accordingly, in a product-by-process claim, the patentability of a product does not depend on its method of production. In that, it is further noted that the product in the instant claims is the same as or obvious over the product of the prior art.

With respect to claims 7 and 14:

It is disclosed that the electric conductor is made from copper (COL 6, lines 30-40).

Ohsaki et al disclose a secondary battery comprising an anode material according to the aforementioned aspects. However, Ohsaki et al do not disclose the specific weight percent of the carbon fiber and the specific average diameter and length of the graphite carbon.

As to claims 1-3, 8-10 and 15:

Nakagiri et al disclose a negative electrode for non-aqueous electrolyte rechargeable batteries (TITLE) wherein the negative electrode comprises an electronically conductive material being a carbonaceous material comprising fibrous carbon having a fiber length of 1-20 μm and a diameter of 0.1-0.5 μm , and said fibrous carbon in the carbonaceous material is in the range of 1-20 wt % of the active material and said electronically conductive material (CLAIM 1). It is disclosed that the carbonaceous material include graphite type carbons such as artificial graphite, natural or scaly graphite and the like and expanded graphite (COL 5, lines 45-55), and it is also preferable to use a fibrous carbon together (COL 5, lines 60-62) wherein the carbonaceous material include the fibrous carbon such as vapor-phase growth carbon fiber (COL 6, lines 5-15).

Particularly, Nakagiri et al teach specific examples wherein the percentage of fibrous carbon (fiber %) is 1 %, 10 % and 20 % (See TABLE 6) as well as the length being

Art Unit: 1745

approximately 10 μm and the diameter approximately 0.25 μm (*that is to say, about 200 nm*) (See **EXAMPLE 5**). Also, **Table 5** shows different length and diameter dimensions of the fibrous carbon including diameter ranging from 0.1 to 0.5 μm and length of at least 20 μm (COL 17, line 50 to COL 18, line 12).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to include the specific weight percent of the carbon fiber of Nakagiri et al in the anode of Ohsaki et al as Nakagiri et al disclose that in the range where the ratio of the fibrous carbon in the carbonaceous material is 1-20 wt % for the composite particle of the negative electrode material, every cycle life for the active material particle of the material exhibit 92 % or more, which indicates satisfactory cycle life characteristics. This seems to indicate that, in the case where the ratio of fibrous carbon is less than 1 wt % for the composite particle of the negative electrode material, the effect of the present range, which employs the increase of the contact point due to the fibrous carbon and the large recovery force thereof, can hardly emerge, and in the case 50 wt % or more, the decrease of the charging and discharging capacity is occurring and so is the coagulation of the fibrous carbon. *Thus, Nakagiri et al directly teach the weight percent of the carbon fibers within the claimed range.*

As to the specific average diameter and length of the graphite carbon, it would have been obvious to one skilled in the art at the time the invention was made to make the carbon fiber of Ohsaki et al by having the specific average diameter and length of the graphite carbon of Nakagiri et al as Nakagiri et al disclose that in the case that the length of the fibrous carbon is less than 1 μm , which is short, the discharging capacity of the initial cycle becomes small and the cycle life becomes poor. It is considered that this is because electric contacts among the active

material particles are not satisfactory so that the electron conductance network, which is supposed to contribute to the electrochemical reaction of all particles, cannot be made and active material particles, which cannot relate to the electrochemical reaction, are appeared. And in the case that the length of the fibrous carbon exceeds 20 μm , the discharging capacity of the initial cycle again becomes small and the cycle life also becomes poor. It is considered that this is because the fibrous carbon entangles to coagulate and the dispersion properties of the fibrous carbon for the active material particles are not satisfactory so that the contact points between the active material particles and the fibrous carbon become fewer, which generates the active material particles that cannot relate to the electrochemical reaction. And in the case that the diameter of the fibrous carbon exceeds 0.5 μm , the initial discharging capacity and cycle life both become somewhat smaller. It is considered that this is because, in spite of the fact that the ratio of the fibrous carbon in a form of fine threads decreases so that the surface in the diameter direction becomes more prone to contact the active material particles than the surface in the longitudinal direction, the surface including the diameter direction lacks the flexibility, of which the condition is close to that of a plane. And, therefore, the effect of increasing the contact points in accordance with the present anode can hardly emerge. *Thus, Nakagiri et al directly teach the carbon fiber diameter and length within the claimed range.*

Response to Arguments

To the extent applicants' arguments were understood by the examiner please note the following response to arguments:

Art Unit: 1745

1. Applicant's arguments filed 01/15/04 and 06/28/04 have been fully considered but they are not persuasive.
2. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). *It appears that applicants are focusing and/or concentrating the main contention of their argument by analyzing the references alone or individually. However, what is important under this 35 USC 103 rejection using a combination of references is what the combined teachings of both references (either expressly, implicitly, directly or indirectly) suggest to those of ordinary skill in the art at the time the invention is made.*
3. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). *In this case, both references are pertinent to one another as they both address the same problem of providing suitable carbon-based negative electrode for electrochemical cell applications.*
4. In response to applicant's argument that: a) "*the cited references are not combinable*"; b) "*the suggested combination would yield an anode made up of substantially of a polymeric binder rather than spherical graphite with a small percentage of fibres....Furthermore, such an anode*

would be useless in a lithium battery", the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

5. In response to applicant's argument that: a) *"a relatively small addition of carbon nano-fibres may greatly enhance the performance characteristics of an anode which is principally spherical graphite powder. A further aspect of the invention is recognizing how using carbon nano-fibres which have been heated in a partial vacuum yields even further significant cycle life increases"*; b) *"Such fibres are however a very expensive commercial product by virtue of the preparation process"*; c) *"In other words, [sic] if the graphitized vapour grown carbon fibres have a specific surface area of not more than 5 m²/g they are advantageous compared with a plate-like graphite"*, the fact that applicant has recognized another advantage/disadvantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

6. With particular respect to the assertion that: a) *"the relatively small addition of carbon nano-fibres may greatly enhance the performance characteristics of an anode"*; b) *"using carbon nano-fibres which have been heated in a partial vacuum yields even further significant cycle life increases"*; c) *"Furthermore, although the dimensions of the carbon being used in Nagakiri may be within the specified ranges, Nagakiri uses a different kind of carbon which would have a different crystalline natures that that of the present invention or Ohsaki"*; d)

*“Furthermore such an anode would be useless in a lithium battery”; e) “Applicant respectfully disagrees on the basis that his would be impossible (to include the specific weight percent of the carbon fibre of Nakagiri and the anode of Ohsaki)”, it is noted that such applicants’ assertion are not supported by factual evidence when compared to the closest prior art (*to show unexpected results*), and/or as combined in the applied art rejection presented hereinabove. Furthermore, since there are insubstantial differences between “*the anode*” of the prior art and “*the claimed anode*”, and none of the two applied references do provide any indication that its(their) anode(s) is(are) specially restricted to any particular electrochemical cell environment as argued and speculated by the applicants, the burden is shifted to the application to provide objective evidence demonstrating that Nakagiri et al’ anode when used as applied in the anode/battery of Ohsaki et al will indeed cause detrimental effects thereto. That is to say, the burden is shifted to the applicants to supply, provide or present objective evidence showing why Nakagiri et al’ anode cannot function in a substantially similar battery environment.*

In this regard, the examiner further asserts that it is not enough that applicant’s representative personally believes that the combined prior art cannot function together or the presently claimed invention exhibits superior results/performance. That is to say, the arguments of counsel cannot take the place of evidence in the record. An assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of inherent anticipation/obviousness (See ***MPEP 716.01 and 2145: Consideration of Applicant’s Rebuttal Arguments***). Stated somewhat differently, a statement or argument by the attorney is not factual evidence.

7. With respect to the method limitations of claims 5-6, 12-13 and 15-18, it is noted that the instant claims are being construed as product-by-process claims and that the product itself does not depend on the process of making it. Accordingly, in a product-by-process claim, the patentability of a product does not depend on its method of production. In that, it is further noted that the product in the instant claims is the same as or obvious over the product of the prior art. In this case, the prior art teaches carbon fibres. In consequence, the references are teaching substantially the same product and constituents as the product made by the method of the instant claims. Therefore, the patentability of a product is independent of how it was made. However, there may be situations when the manner in which a product was made should be given consideration. Thus, burden is on applicants to show differences in product-by-process claims as well as in product comparisons. Further, even though the prior art may fail to disclose other physical properties, in view of the substantially similar products being disclosed in the instant application, the examiner has a reasonable basis to suspect that the claimed product and the prior art products would be substantially the same. Since PTO does not have proper equipment to carry out the analytical tests, the burden is then shifted to applicants to provide objective evidence demonstrating the claimed product is necessarily different from the prior art's product, and that the difference is unobvious (*Refer to MPEP 2113: Product-by-Process Claims*).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro
Examiner
Art Unit 1745

